Hartford, Connecticut’s capital city, is an urban community centrally located within the Region. It has a land area of 17.3 square miles and an estimated population of nearly 125,000. The elevation ranges from approximately 30 to 150 feet above sea level. Hartford drains to two watersheds – the Connecticut River to the east and the Park River to the west. In addition to the Connecticut and Park Rivers, other watercourses within the City include Cemetery and Gully Brooks. Interstates 91 and 84 intersect in Hartford. State routes 44, 187 and 189 also traverse the City.

Hartford is home to the Capitol and numerous state office buildings and other facilities. Brainard Airport is located in the southeastern corner of the City. Numerous industries and businesses operate throughout Hartford, including many insurance companies. The City also houses three major hospitals: Hartford, Connecticut Children’s, and St. Francis. The City is also home to Trinity College and the University of Hartford. The University of Connecticut and University of St. Joseph has branches in the Downtown area. Finally, Hartford attracts many visitors throughout the year to its historic, arts and cultural venues including among others the Convention Center, XL Center, Riverfront Recapture, Comcast Music Theater, the Wadsworth Atheneaum, the Connecticut Science Center, the Old State House, Mark Twain and Harriet Beecher Stowe Houses, and the Bushnell Center for Performing Arts.

Challenges

Historically, Hartford has suffered significant losses from flooding and continues to be vulnerable to the risks posed by flooding. The Army Corps of Engineers built a dike in Hartford along the Connecticut River following historic floods in 1936 and 1938. The City has maintained the levee system for 70 years, and recently began a $21 million capital improvement program devoted to the system. The flood control system is an Accredited Levee under FEMA’s map modernization project. Hartford has not approved any building construction within the 100 year floodplain and has undertaken significant work since the adoption of the 2008 Plan to reduce its vulnerability to flooding as detailed in the list below:

**Hartford Flood Control Projects completed during the period 2008 to 2013**

1. **Hartford Dike Repair and Maintenance Project:** Completed in 2009, Cost: $5,000,000.
   - Work accomplished: Levee Rip Rap Repair, Vegetation removal and animal burrow repair, Structural repairs on flood wall, Toe drain and drainage ditch repairs, construction of Access road on river side, Perform system certification analysis, testing and engineering.
2. **Replacement of Diesel Engines, Gears and Equipment at North Meadow Pump Station and South Meadow Pump Station:** Completed: 2009, Cost: $624,000
   - Work accomplished: Replaced four diesel engines at South Meadow pump station and four diesel engines at North Meadow pump station. Changed the gear box ratio for eight pumps. Installed five backstops for engines at South Meadow pump station.
3. **Replacement of Valve Operators at Three Pump Stations:** Completed: 2008, Cost: $475,000
   - Work accomplished: Replaced Valve Operators at South Meadow, Keney Lane and Bushnell park pump stations.
4. **Replacement of Valve Operators at North Meadow Pump Station:** Completed: 2009, Cost: $294,000
   - Work accomplished: Replaced four valve operators at North Meadows pump station.
5. **Folly Brook Conduit Repairs:** Completed: 2011, Cost: $ 1.00 Million
Work accomplished: Internal repair/rehabilitation to concrete and steel sections.

6. Park River and Auxiliary Conduits Sediment Removal and Maintenance: Completed: 2011, Cost: $2.9 Million
   Work accomplished: Removed 8500 CY of Sediment from Auxiliary Conduit.

7. Weston Street and West Service Road Drainage Improvement (Phase 1): Completed: 2009, Cost: $283,000.00
   Work accomplished: Drainage improvements to correct levee interior drain problem.

8. North and South Meadows Pond Dredging and Restoration Project: Completed 2013, Cost: $3,880,000
   Work accomplished: Removed sediment from North Meadow Pond and South Meadow Pond.
   Installed fore bays at inlet locations in the pond.

   Installed new Piezometers to measure levee under seepage.

In addition to the map modernization project, the Metropolitan District Commission’s (MDC) Clean Water Project also poses significant opportunities and challenges to the City. As planning for the separation of storm water and sewer lines in the City and region, much of which discharges to the Connecticut River in Hartford, it is critical for the City to monitor potential impacts on flood control infrastructure.

The National Flood Insurance Program has paid fifty property damage claims in Hartford totaling $649,546 to-date. Hartford has had nine Repetitive Loss Property claims to-date on two properties with payments totaling $83,047. A significant flood event could result in much damage. CRCOG used FEMA’s Hazus-MH model to analyze the risks that the City of Hartford might face from a major flood. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be over $206 million. The impacts of such a flood are summarized below:

<table>
<thead>
<tr>
<th>Estimated Damages from 100-Year Flood</th>
<th>Households Displaced</th>
<th>812</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>People Needing Shelter</td>
<td>2,034</td>
</tr>
<tr>
<td></td>
<td>Buildings at Least Moderately Damaged</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>Expected Damage to Essential Facilities</td>
<td>At least moderate damage and loss of use to one fire station and one school</td>
</tr>
<tr>
<td></td>
<td>Total Estimated Economic Losses</td>
<td>$206,450,000</td>
</tr>
<tr>
<td></td>
<td>Total Residential Building &amp; Content Losses</td>
<td>$38,770,000</td>
</tr>
<tr>
<td></td>
<td>Total Commercial, Industrial &amp; Other Building &amp; Content Losses</td>
<td>$165,740,000</td>
</tr>
<tr>
<td></td>
<td>Total Business Interruption Losses</td>
<td>$1,950,000</td>
</tr>
</tbody>
</table>

CRCOG also used FEMA’s Hazus-MH model to analyze the risks that the City of Hartford might face from a hurricane as powerful as the 1938 hurricane. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to such a Category 3 hurricane would be nearly $565 million. The City’s hospitals would likely suffer moderate damage but would not be expected to experience loss of use. The impacts of such a storm are summarized below:
Estimated Damages from a 1938 Strength Hurricane

<table>
<thead>
<tr>
<th>Damage Category</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Households Displaced</td>
<td>1707</td>
</tr>
<tr>
<td>People Needing Shelter</td>
<td>625</td>
</tr>
<tr>
<td>Buildings at Least Moderately Damaged</td>
<td>3134</td>
</tr>
<tr>
<td>Buildings Completely Damaged</td>
<td>58</td>
</tr>
<tr>
<td>Total Estimated Economic Losses</td>
<td>$564,530,000</td>
</tr>
<tr>
<td>Total Residential Building Losses</td>
<td>$343,675,000</td>
</tr>
<tr>
<td>Total Commercial, Industrial &amp; Other Building Losses</td>
<td>$140,680,000</td>
</tr>
<tr>
<td>Total Business Interruption Losses</td>
<td>$80,175,000</td>
</tr>
<tr>
<td>Total Debris Generated</td>
<td>88,973 tons</td>
</tr>
<tr>
<td>Truckloads (at 25 tons/truck) of building debris</td>
<td>2820</td>
</tr>
</tbody>
</table>

According to information from the City and Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to the City and other local public and nonprofit agencies of over $7.4 million. These expenses include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses.

<table>
<thead>
<tr>
<th>Applicant City &amp; Other Agencies</th>
<th>100% of Amount Eligible for 75% Reimbursement</th>
<th>Total Damages Eligible for Public Assistance Due to 2011 Disasters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other = Fire Districts, Schools, Private Non-Profit Agencies</td>
<td>DR-1958-CT 2011 Snow WS Charlotte</td>
<td>DR-4023-CT Irene August 2011</td>
</tr>
<tr>
<td>City of Hartford</td>
<td>$1,996,519.30*</td>
<td>$176,984.14</td>
</tr>
<tr>
<td>Other Agencies</td>
<td>$230,581.69</td>
<td>$261,043.73</td>
</tr>
<tr>
<td>Hartford Total</td>
<td>$2,227,100.99</td>
<td>$438,027.87</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$4,772,527.92</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$7,437,656.78</td>
</tr>
</tbody>
</table>

*Amount being reviewed by FEMA

Goals, Objectives and Strategies

**GOAL: REDUCE LOSS OF LIFE, PROPERTY AND ECONOMIC CONSEQUENCES AS A RESULT OF NATURAL DISASTERS**

Objective 1:
Reduce the likelihood of flooding by improving existing natural and artificial drainage systems.

*Currently the MDC is addressing this issue with improvements to existing systems. The City’s DPW is also making improvements to plans and operational systems to address flooding.*

Strategic Actions:

1.1 Pursue priority drainage projects identified in Capital Improvement Plan.

Lead: Public Works, Emergency Management, Administration
Priority: High
Status: This is an established and sustained effort. Work is expected to be undertaken annually contingent upon availability of funding
Potential Funding Sources: City operating budget, Federal & State
Timeframe: 2014-2019

Objective 2:
Address combined sewer overflows.

*The MDC has made systematic improvements to the sewer systems within city limits to address overflow issues consistent with heavy rains.*

Strategic Actions:

2.1 Continue to participate in the MDC’s Clean Water Project planning process.
Lead: Metropolitan District (MDC), Public Works, Emergency Management
Priority: High
Status: This is an established and sustained effort. Staff will continue participation in periodic meetings with MDC.
Potential Funding Sources: MDC
Timeframe: 2014-2019

2.2 Ensure that the City’s flood control pump stations can handle changes that may result from MDC measures to address combined sewer overflows.
Lead: Public Works, Emergency Management
Priority: High
Status: This is an established and sustained effort. Reviews are conducted as information becomes available.
Potential Funding Sources: City operating budget, Federal & State
Timeframe: 2014-2019

Objective 3:
Ensure proper maintenance of flood control system.

*The City’s DPW has a detailed plan for maintaining the existing flood control systems.*

Strategic Actions:

3.1 Continue to implement necessary repairs and upgrades required by FEMA and the Army Corps of Engineers to retain certification.
Lead: Public Works, Emergency Management
Priority: High
Status: This is an established and sustained effort.
Potential Funding Sources: City operating budget, Federal, State
Timeframe: Work to be scheduled annually during the 2014-2019 plan period
3.2 Update the flood control system maintenance manual.
Lead: Public Works, Emergency Management
Priority: Medium
Status: This is an established and sustained effort. Periodic updates will be made as needed.
Potential Funding Sources: local
Timeframe: 2014-2019

3.3 Train City employees, according to the updated manual, in proper maintenance techniques.
Lead: Public Works
Priority: Medium
Status: This is an established and sustained effort.
Potential Funding Sources: local
Timeframe: It is anticipated that training will be offered at least annually throughout the 2014-2019 plan period.

3.4 Upgrade flood control facilities to automate warning systems and as many other features as possible to increase safety.
Lead: Public Works
Priority: High
Status: Deferred while funding is investigated.
Potential Funding Sources: Grants, state bonding
Timeframe: 2014 – 2019

Objective 4:
Develop system for identifying and addressing potential debris hazards.

The Department of Public Works has contingent plans and resources to address potential post-storm debris issues and is working with the State’s Interagency Debris Management Task Force CCM Municipal Management Bulletin #13-24.

Strategic Actions:

4.1 Pursue priority debris related projects, especially along the North Branch of the Park River, identified in the Capital Improvement Plan
Lead: Public Works, Emergency Management
Priority: Medium
Status: This is an established and sustained effort.
Potential Funding Sources: City operating budget, Federal & State
Timeframe: 2014-2019: Annually, contingent upon funding

4.2 Inspect and clean Park River relief conduit.
Lead: Public Works
Priority: Medium
Status: This is an established and sustained effort.
Potential Funding Sources: City operating budget, Federal & State
Timeframe: 2014-2019: Every year

Objective 5:
Improve the ability of emergency responders to prepare and respond to natural disasters.

Hartford Fire Department’s Department Directive titled “Storm Warnings and Preparedness” (DD 4.1 EOP) directly addresses the preparation levels necessary to effectively organize and respond to natural disasters. CRCOG’s Regional Emergency Support Plan (RESP Plan) also provides preparedness and response direction.

Strategic Actions:

5.1 Continue with National Incident Management System (NIMS) and Incident Management Team training, with a particular focus on response to natural disasters.
  Priority: High
  Status: This is an established and sustained effort.
  Potential Funding Sources: Regional & State Partners
  Timeframe: It is anticipated that training will be offered at least annually during the 2014-2019 plan period

5.2 Investigate communications systems that will allow for emergency personnel to communicate in currently uncovered areas, and will facilitate interdepartmental communications along the flood control system.
  Priority: Low
  Status: Completed

5.3 Research, identify means, including potential acquisition of public address systems, for facilitating communications with residents, especially those in low-income areas vulnerable to disasters.
  Lead: Emergency Management, Police, Fire, Emergency Services & Telecommunications
  Priority: Medium
  Status: Work is currently being undertaken.
  Potential Funding Sources: Federal, State, & Regional
  Timeframe: Study expected to be completed 2014

Objective 6:
Improve the ability of emergency responders to serve special needs populations during natural disasters.
The Hartford Fire Department’s Special Services division in conjunction with the City of Hartford’s CERT team have prepared and trained to address this specific issue. CRCOG’s Regional Emergency Support Plan (RESP Plan) also provides preparedness and response direction.

Strategic Actions:

6.1 Take full advantage of the Reverse-911 system.
   Lead: Police, Fire, Emergency Management, Health & Human Services, Emergency Services & Telecommunications
   Priority: Medium
   Status: Completed

6.2 Continue training for evacuation of special needs populations.
   Lead: Police, Fire, Emergency Management, Health & Human Services
   Priority: Medium
   Status: This is an established and sustained effort.
   Potential Funding Sources: None needed
   Timeframe: 2014-2019: training will be offered annually.

6.3 Support regional assessments of how to identify, maintain and use databases of special needs populations.
   Lead: Emergency Management, Health & Human Services
   Priority: Medium
   Status: This is a sustained effort.
   Potential Funding Sources: City operating budget, Federal & State
   Timeframe: 2014-2019

Objective 7:
Improve emergency communications to residents prior to and during natural disasters.

Hartford Fire Department has several communication methods in place such as Twitter, Facebook, Social Media, Media, Everbridge Notification System, as well as a new method soon to be implemented utilizing a smart phone app.

Strategic Actions:

7.1 Continue to offer educational forums for residents on personal emergency planning.
   Lead: Health & Human Services, Emergency Management
   Priority: Medium
   Status: This is an established and sustained effort.
   Potential Funding Sources: Federal, State, City operating budget
   Timeframe: 2014-2019: It is anticipated that forums will be offered at least annually.

7.2 Consider applying to FEMA’s Community Rating System (CRS) program to help reduce flood insurance premiums for property owners.
   Lead: Emergency Management, Planning, Public Works
Objective 8:
Ensure ability of City to safely shelter in place, and when necessary, evacuate residents and visitors.

The City has several shelters in place to serve as gathering points in an emergency. The Hartford Fire Department’s Special Services division in conjunction with the City of Hartford’s CERT team have prepared and trained to address this specific issue. CRCOG’s Regional Emergency Support Plan (RESP Plan) also provides preparedness and response direction.

Strategic Actions:

8.1 Participate in local and regional hurricane evacuation training.
Lead: Emergency Management, Police, Fire
Priority: High
Status: Ongoing: Training exercise completed June 20, 2013. Further training as available will be completed during the 2014-2019 plan period.

GOAL: ENSURE THE ABILITY TO DISTRIBUTE COMMODITIES.

Objective 9:
Improve viability of food commodities during natural disasters.

The Hartford Fire Department’s Special Services division in conjunction with the City of Hartford’s CERT team have prepared and trained to address this specific issue. CRCOG’s Regional Emergency Support Plan (RESP Plan) also provides preparedness and response direction. The City’s Board of Education also has a plan to address this issue.

Strategic Actions:

9.1 Maintain refrigeration for perishable food items.
Lead: Board of Education, Emergency Management, Public Works, Health & Human Services
Priority: High
Status: New Initiative
Potential Funding Sources: Federal, State, Regional
Timeframe: 2014/2015: Within 9 months
Map 37: Hartford Flood Plains, Repetitive Loss Areas, Dams and Important Facilities